EXECUTIVE SUMMARY

This report describes the findings of the remedial investigation at Operable Unit 3 at Hill Air Force Base, Utah (Hill AFB). Operable Unit 3 (OU 3) is one of seven operable units at Hill AFB, which was placed on the National Priority List in July of 1987. In January, 1987, JMM was selected by Hill AFB to conduct an RI/FS for OU 3. Operable Unit 3 consists of seven sites: Berman Pond, Industrial Waste Treatment Plant (IWTP) Sludge Drying Beds, Sodium Hydroxide Tank Site, Buildings 514 and 510, Pond 1, Pond 3, and the Layton Area. The *Draft Final Baseline Risk Assessment for Operable Unit 3, Hill Air Force Base, Utah* (JMM, 1991a), which is part of the RI for OU 3, was submitted as a document separate from this report.

Operable Unit 3 is located near the southern end of Hill AFB on the southwesterly sloping surface of the remnant Weber Delta. Sediments beneath OU 3 consist of interbedded sands, silty and clayey sand with lenses of silt and clay, and clays. The RI yielded evidence of sand-filled, buried channels that are characteristic of the deltaic environment in which OU 3 sediments formed. The shallow aquifer is generally unconfined, and ground water occurs from 12 to 126 feet BGS. The direction of shallow ground-water flow appears to be controlled by a ground-water divide that causes ground water north of this divide to flow generally northwest and ground water south of the divide to flow generally southwest. This divide may be causing the development of two contaminant plumes, one moving northwest and the other moving southwest. Flow velocities in the shallow aquifer range from less than 1 foot per year to 3,500 feet per year.

The principal contaminants in soils and ground water at OU 3 consist of volatile organic contaminants (VOCs) and metals. In soils, cadmium (up to 15.8 milligrams per kilogram (mg/kg)) and chromium (up to 4,620 mg/kg) occur at elevated levels. Antimony, detected at up to 0.3 mg/kg, may be elevated in soils near Pond 1. Dichlorobenzene (up to 20,800 mg/kg), chlorobenzene (up to 875 mg/kg), 1,1,1-TCA (up to 348 mg/kg), and trichloroethene (TCE) (at 55.6 mg/kg) are the principal VOCs in soils. The highest concentrations of these contaminants in soil are associated with Berman Pond. Sodium hydroxide has contaminated soils beneath the Sodium Hydroxide Tank Site, and the bulk of the sodium hydroxide has apparently accumulated at a depth of 25 to 40 feet.

Many metals and VOCs were detected in ground water in the shallow aquifer underlying OU 3. Chromium and barium, at 110 and 1,200 micrograms per liter (µg/L), respectively, appear to be contaminants. Metals data from unfiltered samples collected from near Buildings 510 and 514 suggest several metals (e.g., arsenic, cadmium, lead, nickel, and silver) also may be contaminants. TCE, 1,1,1-TCA, and 1,1-DCE are the most common and widespread VOCs detected in shallow ground water, and they have ranged in concentration up to 200 µg/L, 1,100 µg/L, and 67 µg/L, respectively, which are greater than their MCLs. These contaminants occur in on-Base plumes occupying up to 47 acres. The distribution of their on-Base plumes suggest they are probably from two main sources, Berman Pond and the IWTP Sludge Drying Beds.

Trichloroethene (up to 89 µg/L), 1,1,1-TCA (up to 10 µg/L), and 1,2-DCA (up to 130 µg/L) were frequently detected in the Layton field drains. Off-Base contaminants originated either from early releases from on-Base sources or from off-Base sources in Layton. Although there are potential sources in Layton, there is no compelling evidence to identify one or more as sources. Additional investigation is recommended to determine the source of the off-Base contamination.

Contaminants migrate principally through shallow ground water, although soil, surface water, and air are former or minor routes. Several migration scenarios can explain the distribution of contaminants, both on-Base and off-Base. If on-Base sources are responsible for the off-Base contamination, then the contaminants may have migrated through a pathway that allowed higher velocities, less retardation, and higher dispersion than the on-Base subsurface conditions currently display.